wherein the light-emitting element is mounted a distance away from the entrance orifice with an angle of inclination relative to the optical axis,

wherein the light-emitting elements are arranged on at least two planes parallel to the entrance orifice, a plane furthest removed from the entrance orifice being a circular surface and all other planes being an annular surface having an annular opening, and the light beams emitted by light-emitting elements on a plane further from the entrance orifice illuminate the entrance orifice through the annular opening of the annular surfaces closer to the entrance orifice,

and wherein the aperture, the distance and the angle of inclination are selected such that the light beam illuminates an area that corresponds substantially to the surface of the entrance orifice.

19. (New) The irradiation unit as claimed in claim 18, in which the light-emitting elements are arranged on three planes.

20. (New) An irradiation unit as claimed in claim 18, where the outer diameter of the plane situated closest to the entrance orifice, measured at the tip of the light-emitting elements, corresponds substantially to the diameter of the entrance orifice.

21. (New) An irradiation unit as claimed in claim 18, wherein the diameter of the opening ring formed by annularly arranged light-emitting elements is greater than the diameter of the circular surface of the plane situated furthest removed from the entrance orifice.

22. (New) An irradiation unit as claimed in claim 18, wherein the distance between the individual planes corresponds substantially to the length of a light-emitting element.

23. (New) An irradiation unit as claimed in claim 18, wherein the light-emitting element on the at least two planes have different angles of inclination.

24. (New) An irradiation unit as claimed in claim 18, wherein the angle of inclination of the light-emitting elements on the plane situated closest to the entrance orifice is greater than the angle of inclination of the light elements of all other planes situated further removed from the entrance orifice.

25. (New) An irradiation unit as claimed in claim 18, wherein the annularly arranged light-emitting elements are tilted toward the center of the ring by an angle in the range from 10° to 30°.

26. (New) An irradiation unit as claimed in claim 18, wherein the light-emitting elements are thermally connected to a housing.

27. (New) An irradiation unit as claimed in claim 18, wherein the light-emitting elements are arranged with different angles of inclination in a substantially planar holder.

28. (New) An irradiation unit as claimed in claim 18, wherein the light-emitting elements each has an anode and a cathode, wherein the holder is a circuit board having a top side and a rear side and both sides being coated, and wherein the anode is contacted to the top side, and the cathode is contacted to the rear side.

29. (New) An irradiation unit as claimed in claim 18, wherein the light-conducting unit is a rigid optical fiber rod or a flexible optical conductor.

30. (New) An irradiation unit as claimed in claim 18, further comprising a prismatic disk located between the light-emitting unit and the light-conducting unit.

31. (New) An irradiation unit as claimed in claim 30, wherein the prismatic disk has the shape of a flat conical frustum whose smaller diameter corresponds substantially to the diameter of the entrance orifice.

32. (New) An irradiation unit as claimed in claim 30, wherein the smaller side of the prismatic disk faces the light-emitting unit.

33. (New) An irradiation unit as claimed in claim 18, wherein the diameter of the entrance orifice is in the range from 8 to 14 mm, and 8 to 15 light-emitting elements are located on a first plane closest to the entrance orifice.

34. (New) An irradiation unit as claimed in claim 33, wherein 5 to 12 light-emitting elements are located on a second plane next to the first plane.

35. (New) An irradiation unit as claimed in claim 34, wherein 1 to 7 light-emitting elements are located on a third plane next to the second plane.

36. (New) An apparatus for hardening dental filling materials, comprising an irradiation unit of claim 18.

37. (New) A method for hardening dental filling materials, comprising irradiating the dental filling materials using the irradiation unit of claim 18.